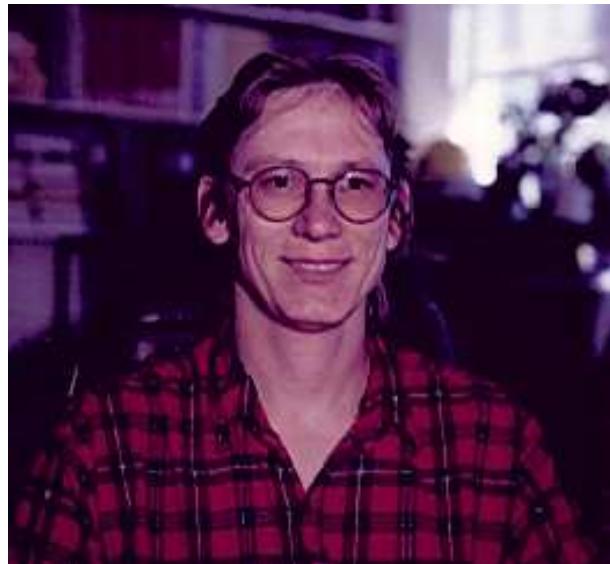


# Curriculum Vitae

## R. H. W. Friedel



Also available on-line<sup>1</sup> .

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<sup>1</sup><http://nis-www.lanl.gov/~friedel/curiculum/curiculum.html>



# Contents

<b>1 Personal Details</b>	<b>1</b>
1.1 Status . . . . .	1
1.2 Work Address: . . . . .	1
1.3 Home Address: . . . . .	2
1.4 Past Residence: . . . . .	2
<b>2 Academic Curriculum Vitae</b>	<b>3</b>
2.1 Academic qualification . . . . .	3
2.2 Teaching Experience . . . . .	4
2.3 Academic Awards . . . . .	4
2.4 Other Awards . . . . .	4
2.5 Visiting Scientist . . . . .	5
2.6 Conference contributions . . . . .	5
2.7 List of Papers . . . . .	21
2.8 List of Seminars . . . . .	26
<b>3 Non-academic Curriculum Vitae</b>	<b>29</b>
3.1 Vacational and other employment: . . . . .	29
3.2 Licences and other achievements: . . . . .	29
3.3 Sports, Clubs and Societies: . . . . .	30
3.4 Other hobbies and interests: . . . . .	30
3.5 Next of Kin: . . . . .	30



# Chapter 1

## Personal Details

*Status, Addresses, Residence*

### 1.1 Status

<b>Name:</b>	Reinhard Hans Walter FRIEDEL
<b>Born:</b>	April 12, 1963 in Ingolstadt, Federal Republic of Germany
<b>Nationality:</b>	German and South African
<b>Languages:</b>	English and German (fluent written and spoken) Afrikaans spoken, Portugese read, Latin A-levels
<b>Status:</b>	German Citizen by birth Naturalised Citizen of the Republic of South Africa Holder of German and South African Passports Holder of US permant residence ("Green Card") Resident in Los Alamos, NM, USA
<b>Occupation:</b>	Research Physicist
<b>Degrees:</b>	B.Sc.Eng. (Electronic), B.Sc.(Honors), Ph.D. (Physics)
<b>National Service:</b>	Not eligible in South Africa or Germany
<b>Marital Status:</b>	Married
<b>Dependants:</b>	One daughter
<b>Employment:</b>	Technical Staff Member at Los Alamos National Laboratory, NIS-2, since 24 November 1997

### 1.2 Work Address:

Los Alamos National Laboratory  
NIS-2, MS D-436, Los Alamos, NM 87544, USA  
Phone: +1 505 665-1936  
Fax: +1 505 665-4414  
email: friedel@lanl.gov  
www: <http://nis-www.lanl.gov/~friedel>

### 1.3 Home Address:

1629 39th Street, Los Alamos, New Mexico 87544, USA  
 Phone: +1 505 667-0717  
 email: friedel@losalamos-nm.com  
 www: <http://www.cybermesa.com/~friedel>

### 1.4 Past Residence:

Place and country	Period
Ingolstadt, Federal Republic of Germany	Apr.63 – Nov.64
Bombay, India	Nov.64 – Dec.65
Rio de Janeiro, Brazil	Jan.66 – Nov.70
Pretoria, Republic of South Africa	Dec.70 – Dec.73
Bad Honnef, Federal Republic of Germany	Jan.74 – Dec.77
Wellington, New Zealand	Jan.78 – Feb.81
Westville, Republic of South Africa	Feb.81 – Dec.85
SANAE Base, Antarctica (70°S 02°W)	Jan.86 – Jan.87
Durban, Republic of South Africa	Feb.87 – May 92
Katlenburg-Lindau, Germany	Jun.92 – Nov 97
Los Alamos, New Mexico, USA	Nov 97 – present

The residence record until 1985 was due to my father's occupation as German Diplomat. His last appointment in South Africa was as the German Consul in Durban, April 1981 to April 1985.

# Chapter 2

## Academic Curriculum Vitae

*Academic qualifications, Teaching, Academic Awards, Visiting Scientist, publications and contributions to conferences*

### 2.1 Academic qualification

#### School record:

Name of Institution	Years attended
Escola do Corcovado (German), Rio de Janeiro, Brazil	1968 – 1970
Deutsche Schule Pretoria, Republic of South Africa	1970 – 1973
Konrad-Adenauer Gymnasium, Bad Godesberg, Germany	1973 – 1974
Siebengebirgsgymnasium, Bad Honnef, Germany	1974 – 1977
Hutt Valley High School, Lower Hutt, New Zealand	1978 – 1980

#### Highest school qualification:

New Zealand University Scholarship (British A-Levels)

Approximate Accessit to the Dux

SA Matriculation Exemption 1 January 1980

#### Tertiary Education: (Durban, Republic of South Africa)

Name of Institution:	Attended:	Degree:	Status:
University of Natal	1981 – 1984	B.SC.ENG(Elec)	completed
University of Natal	1985 – 1985	B.SC.HON(Phys)	part-time
University of Natal	1987 – 1987	B.SC.HON(Phys)	completed
University of Natal	1988 – 1989	M.SC.(Phys)	converted
University of Natal	1990 – 1991	Ph.D.(Phys)	completed

Ph.D. supervisors: Dr. A.R.W. Hughes and Prof. A.D.M. Walker, both at Space Physics Research Institute, Department of Physics, University of Natal, Durban 4001, Republic of South Africa

Ph.D. Thesis title:

“A study of wave induced electron precipitation at low and middle latitudes”

External examiners:

Hal Strangeways, Leeds University, UK

## 2.2 Teaching Experience

At University of Natal, Durban, RSA:

Laboratory Assistant	1983, 1984, 1987
Academic Support Tutor	1984, 1985, 1987, 1988, 1989
“Bridging Unit” Tutor (Black Student Support Programme)	1988, 1989, 1991
Lecturing	Semester Course “Electronics for Physicists” plus Lab Course, 2nd year level, 1988 and 1989 “Physics”, 1st year level, 1991

At M.L.Sultan Technicon, Durban, RSA:

Lecturing	Semester Course “Physics for Architects”, 1992
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## 2.3 Academic Awards

URSI Young Scientist Award to attend the URSI WIPP’89 workshop in Dunedin, New Zealand, February 1989

URSI Young Scientist Award to attend the XXIII General Assembly of the URSI in Prague, Czechoslovakia, September 1990

## 2.4 Other Awards

NASA Group Achievement Award: Polar HYDRA Team Global Geospace Science (GGS) Investigations Team, June 16, 1998

NASA Group Achievement Award: Polar Ceppad Team Global Geospace Science (GGS) Investigations Team, June 16, 1998

Los Alamos National Laboratory NIS-2 Achievement award 1999: Publications

## 2.5 Visiting Scientist

Institution	Period
Los Alamos National Laboratory (NIS-2)	13 January 1997 – 09 April 1997
Max-Planck Institute für Aeronomie	July 12 – July 20, 1999

## 2.6 Conference contributions

The presenting author is underlined.

1. R. H. W. Friedel, J. P. H. Taylor, J. P. S. Rash, and M. W. Scourfield, Digital analysis of whistlers, Paper, 30th annual conference of the South African Institute of Physics, Potchefstroom, July 1985.
2. R. H. W. Friedel and A. R. W. Hughes, An analysis system for Trimpf events, Paper, 33rd annual conference of the South African Institute of Physics, Grahamstown, July 1988.
3. R. H. W. Friedel and A. R. W. Hughes, A study of Trimpf events from SANAE, Antarctica, Paper, URSI-WIPP'89 conference, Dunedin, New Zealand, February 1989a.
4. R. H. W. Friedel and A. R. W. Hughes, A study of Trimpf events from SANAE, Paper, 34th annual conference of the South African Institute of Physics, Pretoria, July 1989b.
5. R. H. W. Friedel and A. R. W. Hughes, OPAL and PAMSKI: A new project for the S.P.R.I., Paper, 34th annual conference of the South African Institute of Physics, Pretoria, July 1989c.
6. R. H. W. Friedel and A. R. W. Hughes, Trimpf events observed on low latitudne transmitter paths, Paper, XXIII General Assembly of the URSI, Prague, Czechoslovakia, September 1990.
7. R. H. W. Friedel, A. R. W. Hughes, and A. D. M. Walker, An investigation of gyroresonance interactions at low L-values, Paper, 35th annual conference of the South African Institute of Physics, Port Elizabeth, July 1990.
8. R. H. W. Friedel and A. R. W. Hughes, Enhancement of gyroresonance efficiency by magnetic field topography modulations, Paper, 36th annual conference of the South African Institute of Physics, Bloemfontein, July 1991a.
9. R. H. W. Friedel and A. R. W. Hughes, The effect of magnetic field distortions on gyroresonance at low L-values, Paper, XX General Assembly of the IUGG, Vienna, Austria, August 1991b.

10. **R. H. W. Friedel** and A. R. W. Hughes, Observations of low latitude trimp events at Durban using an OMSKI receiver, Paper, XX General Assembly of the IUGG, Vienna, Austria, August 1991c.
11. **R. H. W. Friedel**, A. Korth, and G. Kremser, Teilsturmbeobachtungen mit dem CRRES satelliten, Paper, Spring Meeting of the Deutsche Physikalische Gesellschaft (Fachgremien AEP, Greifswald, Germany, March 1993a.
12. **R. H. W. Friedel**, A. Korth, and G. Kremser, Substorm onsets observed by CRRES determination of energetic pmisc source regions, Paper, 7th IAGA Assembly, Buenos Aires, Argentinia, August 1993b.
13. **R. H. W. Friedel**, A. Korth, G. Kremser, and S. Ullaland, Substorm onsets at high magnetic latitudes as observed by CRRES, Paper, XVIII General Assembly of the EGS, Wiesbaden, Germany, May 1993c.
14. Pulkkinen, T. I., D. N. Baker, P. K. Toivanen, R. J. Pellinen, **R. H. W. Friedel**, and A. Korth, Magnetic field modelling during the recovery phase, Paper, 7th IAGA Assembly, Buenos Aires, Argentinia, August 1993.
15. Toivanen, P. K., T. I. Pulkkinen, R. J. Pellinen, H. E. J. Koskinen, D. N. Baker, **R. H. W. Friedel**, and A. Korth, Adiabatic modelling of the near-Earth tail during the substorm recovery phase, Paper, XVIII General Assembly of the EGS, Wiesbaden, Germany, May 1993.
16. **R. H. W. Friedel** and A. Korth, Long period observations of energetic particle population in the inner magnetosphere as measured by CRRES between  $1.3$  and  $8 R_e$ , Poster, XIX General Assembly of the EGS, Grenoble, France, April 1994a.
17. **R. H. W. Friedel** and A. Korth, Observations of energetic particle population in the inner magnetosphere over the whole CRRES mission, Paper, Eighth International Symposium on Solar Terrestrial Physics, Sendai, Japan, June 1994b.
18. **R. H. W. Friedel**, A. Korth, G. D. Reeves, and G. Kremser, Origin of energetic pmisc injection at substorm onset as measured by the CRRES spacecraft between  $4$  and  $7 R_e$  and Los Alamos geostationary satellites, Poster, 2nd International Conference on Substorms, Fairbanks, Alaska, March 1994.
19. Korth, A. and **R. H. W. Friedel**, Dynamics of the near-Earth radiation environment: Observations over the whole CRRES mission, Paper, TAOS Workshop on the Earth's Trapped Particle Environment, Taos, USA, August 1994.
20. Korth, A., **R. H. W. Friedel**, D. N. Baker, J. F. Fennell, R. D. Reeves, and S. L. Ullaland, Morning sector pmisc dropouts observed with the CRRES spacecraft between  $5$  and  $7 R_e$ , Paper, 2nd International Conference on Substorms, Fairbanks, Alaska, March 1994.

21. Yeoman, T. K., H. Lühr, **R. H. W. Friedel**, S. Coles, P. N. Smith, M. Grande, C. H. Perry, D. Orr, and H. Singer, CRRES ground-based multi-instrument observations of an interval of substorm activity, Poster, 2nd International Conference on Substorms, Fairbanks, Alaska, March 1994.
22. **R. H. W. Friedel**, E. Keppler, G. D. Loidl, and A. Korth, ISEE measurements for RB modelling and data availability at MPAE, Poster, Radiation Belts: Models & Standards Workshop, Brussels, Belgium, October 1995a.
23. **R. H. W. Friedel** and A. Korth, Long-term observations of keV ion and electron variability in the outer radiation belt from CRRES, Poster, Radiation Belts: Models & Standards Workshop, Brussels, Belgium, October 1995a.
24. **R. H. W. Friedel** and A. Korth, Acceleration of ions and electrons in the keV energy range in the outer radiation belt: Observations from CRRES, Poster, AGU Fall Meeting, San Francisco, USA, December 1995b.
25. **R. H. W. Friedel**, A. Korth, and G. Kremser, Substorm onsets observed by CRRES: Determination of energetic pmisc source regions, Poster, AGU Fall Meeting, San Francisco, USA, December 1995b.
26. Reeves, G. D., G. Henderson, P. S. McLauchlan, R. D. Belian, **R. H. W. Friedel**, and A. Korth, Where do substorm injections occur?, Paper, AGU Fall Meeting, San Francisco, USA, December 1995.
27. Pu, Z. Y., **R. H. W. Friedel**, A. Korth, G. Kremser, and Q. Zong, New spectrometer data techniques to derive convection velocities, currents and ion pressure gradients: GEOS-2 and CRRES data, Paper, AGU Chapman Conference on Measurement Techniques for Space Plasmas: What works and what doesn't, Santa Fe, USA, April 1995.
28. **R. H. W. Friedel** and A. Korth, Detailed probing of boundary structures crossed during energetic particle dropout events observed on the morning side by CRRES during large magnetic storms, Paper, AGU Chapman conference on Storms, Pasadena, USA, February 1996a.
29. **R. H. W. Friedel** and A. Korth, Substorm onset observed by CRRES: Constraints on electron and ion source regions, Paper, Third International Conference on Substorms, Versailles, France, May 1996b.
30. **R. H. W. Friedel** and A. Korth, Review of CRRES ring current observations, Invited Paper, 31st Scientific Assembly of COSPAR, Birmingham, UK, July 1996c.
31. **R. H. W. Friedel** and A. Korth, A dynamic data-driven radiation belt model based on CRRES data, Paper, Symposium on Environment Modeling for Space-Based Applications, ESTEC, Noordwijk, The Netherlands, September 1996d.
32. **R. H. W. Friedel**, A. Korth, and C. Mouikis, Detailed gyroradius probing of boundary structures crossed during energetic particle dropout events observed by CRRES, Poster, AGU Fall Meeting, San Francisco, USA, December 1996.

33. Bourdarie, S., D. Boscher, T. Beutier, J. A. Sauvaud, M. Blanc, and **R. H. W. Friedel**, Salambo 3D: A physical approach for short-term flux modelling, Paper, Symposium on Environment Modelling for Space-Based Applications, ESTEC, Noordwijk, The Netherlands, September 1996.
34. Heynderickx, D., M. Kruglanski, J. Lemaire, D. J. Rodgers, A. D. Johnstone, **R. H. W. Friedel**, E. Keppler, G. D. Loidl, and E. Daly, New features and models in the trapped radiation software package UNIRAD, Paper, Symposium on Environment Modeling for Space-Based Applications, ESTEC, Noordwijk, The Netherlands, September 1996.
35. Korth, A. and **R. H. W. Friedel**, Dynamics of energetic ions and electrons between  $L = 2.5$  and  $L = 7$  during magnetic storms, Paper, AGU Chapman Conference On Magnetic Storms, Pasadena, California, USA, February 1996.
36. Mouikis, C., A. Korth, **R. H. W. Friedel**, B. Wilken, M. Grande, and J. Fenell, Determination of plasma source populations encountered during energetic particle dropouts observed by CRRES using ion compositions measurements of the MICS instrument, Paper, AGU Fall Meeting, San Francisco, USA, December 1996.
37. Reeves, G. D., M. G. Henderson, P. S. McLachlain, R. D. Belian, **R. H. W. Friedel**, and A. Korth, Propagation of the substorm injection region measured by LANL and CRRES, Poster, Third International Conference on Substorms, Versailles, France, May 1996.
38. Pu, Z. Y., Z. X. Chen, M. H. Hong, X. M. Wang, A. Korth, **R. H. W. Friedel**, and G. Kremser, Substorm onset observed by CRRES:Constraints on electron and ion source regions, Poster, Third International Conference on Substorms, Versailles, France, May 1996a.
39. Pu, Z. Y., M. H. Hong, Z. X. Chen, X. M. Wang, A. Korth, **R. H. W. Friedel**, and G. Kremser, A global model for substorm onset based on the configuration instability near the inner edge of the near-earth plasmasheet, Paper, COSPAR MART colloquium, Beijing, China, April 1996b.
40. **R. H. W. Friedel**, C. Mouikis, G. Reeves, D. Belian, T. Cayton, B. Blake, J. Fennell, R. Selesnick, D. Baker, T. Onsager, and S. Kanekal, A multi-spacecraft synthesis of relativistic electron in the innermagnetosphere using LANL, GOES, GPS, SAMPEX, HEO and POLAR, Space Radiation Environment modeling: New Phenomena and Approaches, workshop, Moscow, Russia, October 1997.
41. Korth, A., **R. H. W. Friedel**, and C. Mouikis, Detailed examination of the storm/substorm relationship using energetic particle measurements from the whole CRRES mission, Paper, EGS XXII General Assembly, Vienna, Austria, April 1997a.
42. Korth, A., **R. H. W. Friedel**, and C. Mouikis, Investigation of the substorm/storm relationship using interplanetary magnetic field data and particle measurements from CRRES, Paper, International Symposium on Solar-Terrestrial Coupling Processes, Paros, Greece, June 1997b.

43. **R. H. W. Friedel**, J. Fennell, B. Blake, A. Korth, C. Mouikis, B. Blake, and J. Scudder, Statistics of open/closed field line boundaries as observed by POLAR CEPPAD, HYDRA and CAMMICE, Poster, AGU Fall Meeting, San Francisco, USA, December 1997a.
44. **R. H. W. Friedel**, J. Fennell, C. Mouikis, A. Korth, and J. Scudder, A comparison of open/closed field line boundaries as seen by the CEPPAD and HYDRA instruments on POLAR, Poster, AGU Spring Meeting, Baltimore, Maryland, USA, May 1997b.
45. **R. H. W. Friedel**, A. Korth, and C. Mouikis, Detailed gyroradius probing of boundary structures crossed during energetic particle dropout events observed by CRRES, Poster, Fifth Finnish-US Auroral Workshop, Melbourne, Florida, USA, February 1997c.
46. **R. H. W. Friedel**, A. Korth, and C. Mouikis, A survey of the radiation belt dynamics for the first year of POLAR operations from CEPPAD, HYDRA data, Paper, International Symposium on Solar-Terrestrial Coupling Processes, Paros, Greece, June 1997d.
47. **R. H. W. Friedel**, A. Korth, C. Mouikis, B. Blake, and J. Scudder, A survey of radiation belt dynamics for the POLAR mission from CEPPAD and HYDRA to date, Invited Paper, 8th Scientific Assembly of IAGA, Uppsala, Sweden, August 1997e.
48. **R. H. W. Friedel**, G. Reeves, D. Belian, T. Cayton, B. Blake, J. Fennell, R. Selesnick, D. Baker, T. Onsager, and S. Kanekal, A multi-spacecraft synthesis of relativistic electron in the inner magnetosphere using LANL, GOES, GPS, SAMPEX, HEO and POLAR, Paper, GEM, Snowmass, Colorado, USA, June 1997f.
49. Fennell, J. F., J. L. Roeder, M. Grande, C. Perry, **R. H. W. Friedel**, S. Livi, and T. A. Fritz, Ion trapping at high latitudes in the dayside magnetosphere: POLAR CAMMICE observations, Talk, AGU Fall Meeting, San Francisco, USA, December 1997.
50. J. F. Fennell, J. L. Roeder, **R. H. W. Friedel**, M. Grande, and H. E. Spence, Tail lobe and open field line region boundaries at high altitudes: POLAR and 1995-034 results, Paper, International Symposium on Solar-Terrestrial Coupling Processes, Paros, Greece, June 1997.
51. Korth, A., **R. H. W. Friedel**, and C. Mouikis, Investigation of storm / substorm relationship, Poster, AGU Fall Meeting, San Francisco, USA, December 1997.
52. Mouikis, C., **R. H. W. Friedel**, A. Korth, J. B. Blake, and J. D. Scudder, A survey of radiation belt dynamics for the POLAR mission from POLAR CEPPAD, HYDRA to date, Space Radiation Environment modeling: New Phenomena and Approaches, workshop, Moscow, Russia, October 1997.
53. Mouikis, C., **R. H. W. Friedel**, B. Wilken, and A. Korth, Energetic particle jets encountered during energetic particle dropouts observed by CRRES using ion compositions measurements of the MICS instrument, Paper, EGS XXII General Assembly, Vienna, Austria, April 1997.

54. Reeves, G. D., D. Baker, D. Belian, B. Blake, T. Cayton, J. Fennell, **R. H. W. Friedel**, M. G. Henderson, X. Li, M. M. Meyer, T. Onsager, R. Selesnick, and H. E. Spence, Relativistic electron response to the January 1997 magnetic cloud, Paper, International Symposium on Solar-Terrestrial Coupling Processes, Paros, Greece, June 1997a.
55. Reeves, G. D., R. D. Belian, T. E. Cayton, **R. H. W. Friedel**, M. G. Henderson, D. N. Baker, and H. E. Spence, Energetic particle contributions to a magnetospheric constellation mission, Talk, AGU Fall Meeting, San Francisco, USA, December 1997b.
56. Reeves, G. D., **R. H. W. Friedel**, M. G. Henderson, R. D. Belian, T. E. Cayton, M. M. Meier, D. N. Baker, X. Li, S. Kanekal, J. B. Blake, J. Fennell, R. S. Selesnik, T. Onsager, and H. E. Spence, Relativistic electron flux variations: A new, global ISTP perspective, Talk, AGU Fall Meeting, San Francisco, USA, December 1997c.
57. S.-W. Chang, J. D. Scudder, J. B. Sigwarth, L. A. Frank, N. C. Maynard, W. J. Burke, W. K. Peterson, E. G. Shelley, **R. H. W. Friedel**, J. B. Blake, C. T. Russell, R. A. Greenwald, R. P. Lepping, G. J. Sofko, J.-P. Villain, and M. Lester, Theta aurora, Paper, AGU Fall Meeting, San Francisco, USA, December 1997.
58. Toivanen, P. K., T. I. Pulikkinen, H. E. J. Koskinen, **R. H. W. Friedel**, G. D. Reeves, and A. Korth, Drift modelling of a small storm by continuous substorm activity, Talk, AGU Fall Meeting, San Francisco, USA, December 1997.
59. Reeves, G. D., **R. H. W. Friedel**, M. Henderson, R.D.Belian, A. Korth, and P. McLachlan, Propagation of the substorm injection region measured by the LANL and CRRES, Paper, EGS XXII General Assembly, Vienna, Austria, April 1997.
60. **R. H. W. Friedel**, G. D. Reeves, D. Belian, T. Cayton, C. Moukis, B. Blake, J. Fennell, R. Selesnick, D. Baker, T. Onsager, and S. Kanekal, A multi-spacecraft synthesis of relativistic electrons in the inner magnetosphere using LANL, GOES, GPS, SAMPEX, HEO and POLAR, 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 1998.
61. Bourdarie, S. and **R. H. W. Friedel**, Investigation of artificial and natural relativistic electron loss processes in the radiation belts using the updated SALAMMBÔ code , Poster, AGU Fall Meeting, San Francisco, USA, December 1998.
62. Korth, A. and **R. H. W. Friedel**, Dynamics of the ring current during magnetic storms: Measurements from the CRRES spacecraft , Poster, AGU Fall Meeting, San Francisco, USA, December 1998.
63. **R. H. W. Friedel**, PaPCo (Panel Plot Composer), a common data analysis tool for ISTP (International Solar Terrestrial Physics Program), Poster, ISTP Science Workshop, Goddard, USA, April 1998.
64. **R. H. W. Friedel**, S. Bourdarie, and D. Boscher, Investigation of the efficiency of artificial energetic electron loss processes in the radiation belts using the SALAMMBÔ code, Poster, AGU Spring Meeting, Boston, USA, May 1998a.

65. **R. H. W. Friedel** and J. Faden, Introduction to PaPCo (Panel Plot Composer), a common data analysis tool for ISTP (International Solar Terrestrial Physics Program) and beyond, Poster, AGU Spring Meeting, Boston, USA, May 1998.
66. **R. H. W. Friedel**, G. D. Reeves, D. Belian, T. Cayton, C. Moukis, B. Blake, J. Fennell, R. Selesnick, D. Baker, T. Onsager, and S. Kanekal, A multi-spacecraft synthesis of relativistic electrons in the inner magnetosphere using LANL, GOES, GPS, SAMPEX, HEO and POLAR , 6th Spacecraft Charging Technology Conference, AFRL, Hanscom, USA, November 1998b.
67. **R. H. W. Friedel**, M. F. Thomsen, H. Korth, J. D. Scudder, R. Anderson, and G. D. Reeves, Morphology of the plasmaspheric plasma boundary as observed with POLAR HYDRA and PWI, and LANL MPA , Poster, AGU Fall Meeting, San Francisco, USA, December 1998c.
68. Bourdarie, S., D. Bosher, G. Reeves, T. Cayton, **R. H. W. Friedel**, and R. Selesnick, The January 1997 storm as seen with the Salammbo 3D code, 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 1998.
69. Chang, S., J. D. Scudder, S. Fuselier, J. Fennell, K. Trattner, J. Pickett, H. Spence, J. Menietti, W. Peterson, R. Lepping, and **R. H. W. Friedel**, Cusp energetic ions: A bow shock source, Talk, AGU Fall Meeting, San Francisco, USA, December 1998.
70. Fennell, J. F., J. L. Roeder, J. B. Blake, **R. H. W. Friedel**, G. D. Reeves, M. G. Henderson, M. Grande, T. A. Fritz, and S. Livi, Multiple satellite study of the May 1998 magnetic storm event: Ring current response, Talk, AGU Fall Meeting, San Francisco, USA, December 1998.
71. Henderson, M. G., G. D. Reeves, **R. H. W. Friedel**, S. Bourdarie, H. E. Spence, A. M. Jorgensen, J. F. Fennell, J. Roeder, and J. B. Blake, Energetic neutral atom images derived from the 4D SALAMMBÔ convection-diffusion code: Comparison with POLAR CEPPAD/IPS ENA images, Poster, AGU Spring Meeting, Boston, USA, May 1998.
72. Jahn, J. M., G. D. Reeves, **R. H. W. Friedel**, M. Walt, H. D. Voss, J. B. Blake, R. D. Belian, and T. A. Fritz, Off-equator signatures of energetic particle substorm injections measured with POLAR, Talk, AGU Fall Meeting, San Francisco, USA, December 1998a.
73. Jahn, J. M., M. Walt, G. D. Reeves, **R. H. W. Friedel**, S. J. Lev-Tov, M. G. Henderson, H. D. Voss, and J. B. Blake, Loss of energetic protons in earth's inner magnetosphere measured with POLAR, Poster, AGU Spring Meeting, Boston, USA, May 1998b.
74. Reeves, G. D., T. E. Cayton, **R. H. W. Friedel**, J. M. Jahn, M. G. Henderson, M. M. Meier, D. N. Baker, S. Kanekal, J. B. Blake, J. F. Fennell, and R. S. Selesnick, Relativistic electron observations in the three-dimensional magnetosphere., Poster, AGU Spring Meeting, Boston, USA, May 1998.

75. Vacaresse, A., D. Bosher, S. Bourdarie, A. Korth, and **R. H. W. Friedel**, Linear correlations between the global geomagnetic index Kp CRRES in flight measurements, and SALAMMBÔ 2D proton code results, Poster, 23rd EGS General Assembly, Nice, France, April 1998a.
76. Vacaresse, A., D. Bosher, S. Bourdarie, A. Korth, and **R. H. W. Friedel**, Correlations between measurements and numerical simulation results for ring current protons, 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 1998b.
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## 2.8 List of Seminars

1. Friedel, R. H. W., The effect of magnetic field distortions on gyroresonance at low  $L$ -values, Max-Planck Institute for Aeronomy, Katlenburg-Lindau, Germany, September 1991.
2. Friedel, R. H. W., Stalagtites in the upper atmosphere: "Trimpf Events", Seminar, Department of Physics, Rhodes University, Grahamstown, South Africa, April 1992.
3. Friedel, R. H. W., Stalagtites in the upper atmosphere: "Trimpf Events" - an overview, Max-Planck Institute for Aeronomy, Katlenburg-Lindau, Germany, September 1993a.
4. Friedel, R. H. W., Stalagtites in the upper atmosphere: "Trimpf Events", Department of Geophysics, University of São Paulo, Brasil, September 1993b.
5. Friedel, R. H. W., Substorm onsets observed by CRRES, Seminar, INPE, São José dos Campos, Brazil, August 1993c.
6. Friedel, R. H. W., Stalagtites in the upper atmosphere: "Trimpf Events", Seminar, Department of Geophysics, Kyoto University, Japan, June 1994.
7. Friedel, R. H. W. and P. Chilson, TRIMPIs, RORDs, upward lightning and SOUSY: Possible cross measurements, Max-Planck Institute for Aeronomy, Katlenburg-Lindau, Germany, September 1995.
8. Friedel, R. H. W. and A. Korth, Inner magnetosphere studies conducted using data from the CRRES spacecraft, Los Alamos National Laboratory, Los Alamos, USA, 14 April; SEL Laboratory, NOAA, Boulder, USA, 17 April; APL, Johns Hopkins University, Washington D.C., USA, 21 April; SRC, Polish Academy of Sciences, Warsaw, Poland, 21 July, 1995.
9. Friedel, R. H. W., A. Korth, and G. Kremser, Substorm onsets observed by CRRES: Determination of energetic particle source regions, Dept. of Phycis, University of Iowa, Iowa City, USA, September 1995.
10. Friedel, R. H. W., CRRES energetic particle work using MEA, MEB and LEPA: Overview and specific studies, Los Alamos National Laboratory, Los Alamos, New Mexico, USA, June 1996a.

11. Friedel, R. H. W., Review of CRRES ring current observations, BAS, Cambridge, UK; Warwick University, Warwick, UK; SPRI, University of Natal, Durban, South Africa, July 1996b.
12. Friedel, R. H. W., CRRES energetic particle work using MEA, MEB and LEPA: Overview and specific studies, Dept. of Physcis, University of Iowa, Iowa City, USA, February 1997.
13. Friedel, R. H. W., Friedel projects big and small, NIS-2 Group Seminar, Los Alamos National Laboratory, Los Alamos, USA, February 1999a.
14. Friedel, R. H. W., What energetic particle injections tell us and don't tell us about substorm onset, MPAe Seminar, Max-Planck-Institute für Aeronomie, Katlenburg-Lindau, Germany, April 1999b.
15. Friedel, R. H. W., Plasma sheet access to the inner magnetosphere, NIS-2 Group Seminar, Los Alamos National Laboratory, Los Alamos, USA, June 2000a.
16. Friedel, R. H. W., Plasma sheet access to the inner magnetosphere, Space Physics Research Lab, University of Michigan, Ann Arbor, USA, April 2000b.
17. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - a review, NIS-2 Group Seminar, Los Alamos National Laboratory, Los Alamos, USA, July 2001a.
18. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - do we know enough for predictions?, Physics Department, University Of Otago, Dunedin, New Zealand, July 2001b.
19. Friedel, R. H. W., Toward artificial radiation belt control: Protecting space assets from both nature and man, Physics Department, University Of Otago, Dunedin, New Zealand, July 2001c.
20. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - a review, NASA Goddard SFC, Greenbelt, Maryland, Nov 2001d.
21. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - a review, Dept. of Physcis, Boston University, Boston, MA, USA, February 2002a.
22. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - a review, Dept. of Physcis, University of Oulu, Oulu, Norway, February 2002b.
23. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - a review, Dept. of Physcis, University of Bergen, Bergen, Norway, June 2002c.
24. Friedel, R. H. W., Relativistic electron dynamics in the inner magnetosphere - a review, ONERA/DESP, Toulouse, France, April 2003a.
25. Friedel, R. H. W., Unanswered questions regarding outer radiation belt energetic electrons: losses, NIS-2 Group Seminar, Los Alamos, NM, May 2003b.

# Chapter 3

## Non-academic Curriculum Vitae

*Vac-jobs, sport and hobbies, clubs and societies*

### 3.1 Vacational and other employment:

Employer	Job	Period
ISCOR, Newcastle, RSA	Metal-working training course	Nov.81
SIEMENS, Munich, FRG	Electronics Praktikant	Nov.82 – Feb.83
SIEMENS, Munich, FRG	Electronics Praktikant	Nov.83 – Jan.84
11th International Durban Film Festival	Festival coordinator	Apr.89 – May.89
Dept. of Physics University of Natal	Software Design and system interfacing	Jan.90
12th International Durban Film Festival	Festival coordinator and front of house manager	Mar.90 – Apr.90
13th International Durban Film Festival	Festival coordinator and front of house manager	Mar.91 – Apr.91
14th International Durban Film Festival	Festival coordinator and front of house manager	Apr.92 – May.92

### 3.2 Licences and other achievements:

License / Course / Certificate	Date
First Aid Certificate	77, 83
Motor Vehicle Licence NZ	Apr.78
Motor Vehicle License RSA	Sep.81
Glider Pilot's Solo License	Aug.83
Life Line Course	Jul.85 – Oct.85
Amateur Radio Operator's Certificate	Jun.90
Personal Dynamics Course	Jul.91

### 3.3 Sports, Clubs and Societies:

Luftsportverein Northeim	Soaring
Albuquerque Soaring club	Soaring
Los Alamos Atom Mashers	Home Brew Club
–	Skiing, Cross-country and alpine
–	Running, cycling, tennis and squash

### 3.4 Other hobbies and interests:

Music : Classics and contemporary  
 Reading : Philosophy, Psychiatry, Science Fiction and Asterix!  
 Games : Chess, Backgammon, Bridge, Skat  
 Photography : Color slide and B&W photography,  
                  developing and printing in own darkroom  
                  both Cibachrome and B&W

### 3.5 Next of Kin:

Wife:	Ilse Biel, Journalist, RSA citizen
Daughter:	Gabriella Peppas, stepdaughter, age 13, RSA citizen
Parents:	Wolfgang H. Friedel, Diplomat (German Foreign Office, retired June 1990) Renate D. Friedel (born Mertens), housewife, Life Line Councillor Resident in Oberaudorf, Bavaria, Germany
Sister:	Susanna Y. Friedel, Kindergarten teacher. Resident in Vienna, Austria